

Central England Control Centre

CEB – 1926

Birmingham – 53 Wake Green Road

A District office would have been set up very soon after 1926 to supervise construction and preliminary interconnections within the Central England scheme and would have contained or been associated with an interim Control Room to oversee the expanding network as increasing numbers of stations started trading under temporary contracts and whilst specifications for the permanent Central Indicating Station (CIS), designed to control the eventual trading operations, were being converted into its actual construction.

A report in the "Midland Power" newsletter of June 1969 describes the retirements of two ex-Control Engineers, Bill Williams and Harold Lloyd, both of whom started at Wake Green Road in the 1930s. The report states that Mr Lloyd started in the Control Room in 1933 before moving to "the new Control Room" at the same address in 1934, the year in which full trading in the Central England area commenced.



A previous owner of 53 Wake Green Road had been Sir Barry Jackson, who started the Birmingham Repertory Theatre and lasting evidence of his theatrical status was that the room which was to become the CEB District Director's office contained a small stage.

A study of Ordnance Survey maps of the immediate area shows an interesting progression in the development of the properties eventually acquired by the CEB.

The plan dated 1884 to 1890 shows number 53 Wake Green Road (directly opposite Cotton Lane) was one of three properties under common land registry references of 3659 with 3660 (number 53 totalling just under 3 acres) and 3661 which also contained properties numbered 57 and 59 under the land owner's name of J.Radmore. If the boundary markings shown are correct, number 55 was not at that time part of the Radmore property. Buildings associated with number 53, which could be stables, are shown surrounding a yard area to one side and, behind these, a greenhouse is depicted beside what appears to be an extensive garden. To the front of number 53 is a sweeping semi-circular drive with two entries from Wake Green Road whilst, alongside the entire western boundary, behind numbers 45 to 51, are several smaller properties (possibly of the type referred to earlier) which faced Mayfield Road (odd numbers). However, between numbers 59 and 61 Mayfield Road, there is shown a strip of land on which there is no building. It would appear that this was withheld from land otherwise sold for building, for future additional access to the estate of number 53 Wake Green Road.

Under CEB ownership from around 1927, the stable block was converted into offices and extended to connect with the house and a new single-story building, in the garden behind the house, was built to contain the Central England CIS. This comprised a Control Room, its associated Relay Room with an attached (Lister) diesel house. In a similar manner to other CIS sites, the new building was not initially attached to the house.

The 1936 to 1939 plan shows that number 53's land had been reduced by the disposal of plot 3660 and part of 3661. The original building supposed to have been the stables had been joined to the house by a considerable extension to the latter and behind this an isolated construction is shown, this probably being the Control building. On the western boundary there is shown, as indicated on later plans, an electricity substation.

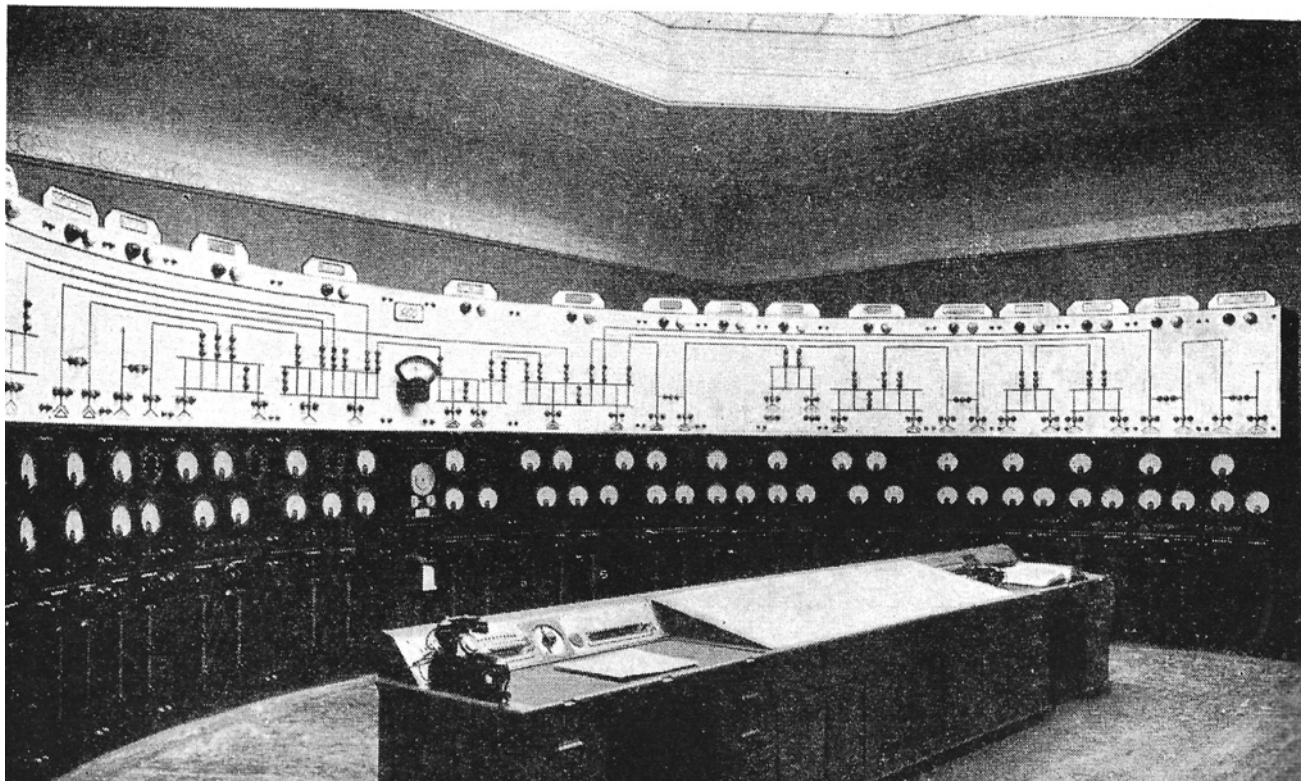
A significant change shown is that the front boundary between numbers 53 and 55 has been removed, indicating that number 55 has been included in the CEB estate. This is further confirmed by a connection shown between the two buildings across the remaining boundary.

Wake Green Road was unique in that its Emergency Control Building (ECB) was situated on the same site as the CIS. It consisted of a reinforced bunker, possibly underground, in the northern corner of the site (not shown on the plan) with an associated petrol-engined generator for lighting and contained only very rudimentary facilities such as static system diagrams and magneto telephones. The CEB national communications plan shows another deviation from the common arrangement in that all the Central England communication circuits converged on the ECB and passed on through interception equipment to the CIS. The advantage of this system was that circuit changeover would not require GPO co-operation, although extensive damage to the site might well have crippled both the main CIS and its ECB and certainly, destruction of the ECB would have blinded the CIS. Despite these disadvantages, this principle was later adopted for the post-war ECBs except that these were remotely located from their GCCs.

Since they lacked engineering experience, the new CEB employed several consultants and to these were delegated responsibility for the Districts to which they were each allocated. The firm of Highfield and Roger Smith were to act for the Central England District and they favoured the General Electric Company of Witton to supply equipment for the new CIS according to the general specifications originated by the CEB Headquarters.

The main Control Room was to the conventional pattern (see picture below) with a sheet steel Indicator Diagram confronting two engineers sitting at each end of a long desk in the middle of which was a miniature switching status diagram. The Indicator Diagram was curved throughout its

length and its upper part, depicting the Grid interconnections and circuit breaker status, was light coloured above the usual black for the lower part which showed metering and tap position indications. In its original form, the top of each section had a pair of lamps, seemingly normally unlit, the purpose of which is not presently known but a study of the CEB Headquarters specification for the Manchester CIS, repeated below and presuming some commonality for all such, might give an explanation.



“Each section was to be provided with an alarm indicator lamp which would light, together with the sounding of an audible alarm device, on the change of condition of any item of switchgear displayed until a silencing key had been operated. The item of switchgear would then be acknowledged by repositioning its miniature diagram symbol into agreement with the condition displayed on the Indicator Diagram.”

Above these indicator lamps were station name plates which were mounted above the tops of the panels. Each circuit breaker status was shown on the Indicator Diagram by a trio of red (closed), amber and green (open) lamps, whereas the specification appears to have required only two.

In the middle of the Indicator Diagram was the usual 3-dial system time-error instrument in its wooden case vertically beneath a large system frequency meter.

The Relay Room was eventually equipped with a test position located by a window whilst the GEC equipment appears mainly to comprise racks of jack-in 14-relay groups with the early Post Office standard "round" (pre-2000 type) dust covers signwritten with their allotted station functions. Prior to this, the equipment had all been plate mounted which did not allow removal of units for maintenance.



The limited space available in the new buildings meant that the Telecommunication Engineer was banished to a less conveniently located office upstairs in the house.

BEA - 1947

Despite the very necessary modernisation and expansion planning which commenced at nationalisation, their fruits would take time to appear and Wake Green Road, becoming overloaded with staff, as well as more Grid sites to control, would have to soldier on for a while.

A post-war plan amended to July 1951 (labelled "B.E. Authority Div. Offices") shows considerable developments together whilst offering explanations of earlier changes seen on the 1933 to 1939 plan. The connection between numbers 53 and 55 is shown as a footbridge and the Control block has been expanded and connected to the rear of the supposed stable building.

In the north of the site on a different level (indicated by connecting pathways having steps in them) there is shown the "T"-shaped plan of a new office building. Behind this is shown three small buildings, one of which is large enough to have been the ECB but which was not shown on the earlier plan.

To the east of the Control block is shown the canteen and a photograph shows that at least part of this building was of single floor construction. It would also appear that the adjacent building (presumably number 57) has been demolished and its land used for further access and car parking.

Thus, expansion of adjacent properties with development at the rear across a shared boundary could have done little for the value of number 57 had it not been previously purchased by the BEA. Compare this with the similar situation at the 1957 Manchester GCC where two adjacent properties became part of the estate in the late 1960s. It is likely that living next door to what had become, in effect, an office block with a diesel generator in its garden could well be an incentive for any neighbour to move away.

As the previous CEB Districts gave way to BEA Generating Divisions, Birmingham controlled a large and increasing pool of generation which had been in excess of 6000MW by 1946. Third only to the outputs of the Manchester and St. Pauls areas (before Paternoster split the Thames Areas in two). Control of this generation required accurate metering as a priority and the mainstays had been Midworth Repeaters and the Synchro-Pulse system, which was much favoured by the then Telecommunications Engineer, W.W. (Whirlwind) Smith, much of this using earth-phantom line signalling. By 1950, when Ken Hooper arrived from Bristol, the ageing GEC telecoms equipment was not working well and previous attempts to speed it up using high-speed relays had been less than successful. Coupled with this was a complex scheme to satisfy the new concept of a "Generation Error" summated display (which Ken eventually off-loaded to Charlie Ollerenshaw) and caused pressure to improve metering generally. This was eased by the adoption of some early STC pulse-rate telemetering equipment such that the Loading desk position eventually acquired an array of these new telemeter displays.

Midworth Repeater

It is known that Midworth Repeaters were used to send meter readings to the CIS BUT the Midworth Repeater exists in two guises. They are both shown below.

The first senses a change in the initiating pointer and causes a small motor to move the contact pointer either up or down to break the contact. In turning the contact pointer shaft the Direction relay is set according to the direction of rotation and a number of pulses sent to the control centre end depending on the angle through which the contact pointer is rotated. At the CIS, the pulses cause the remote meter to rotate to the new position determined by the direction signal and number of pulses received.

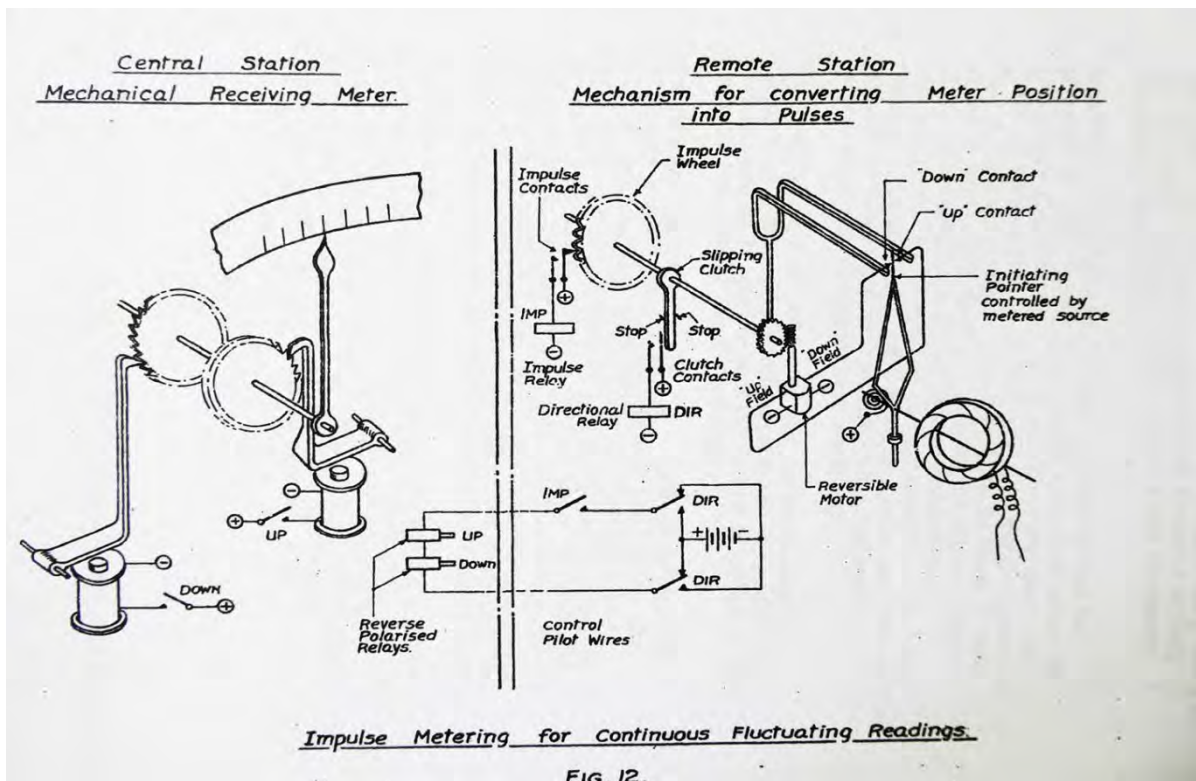
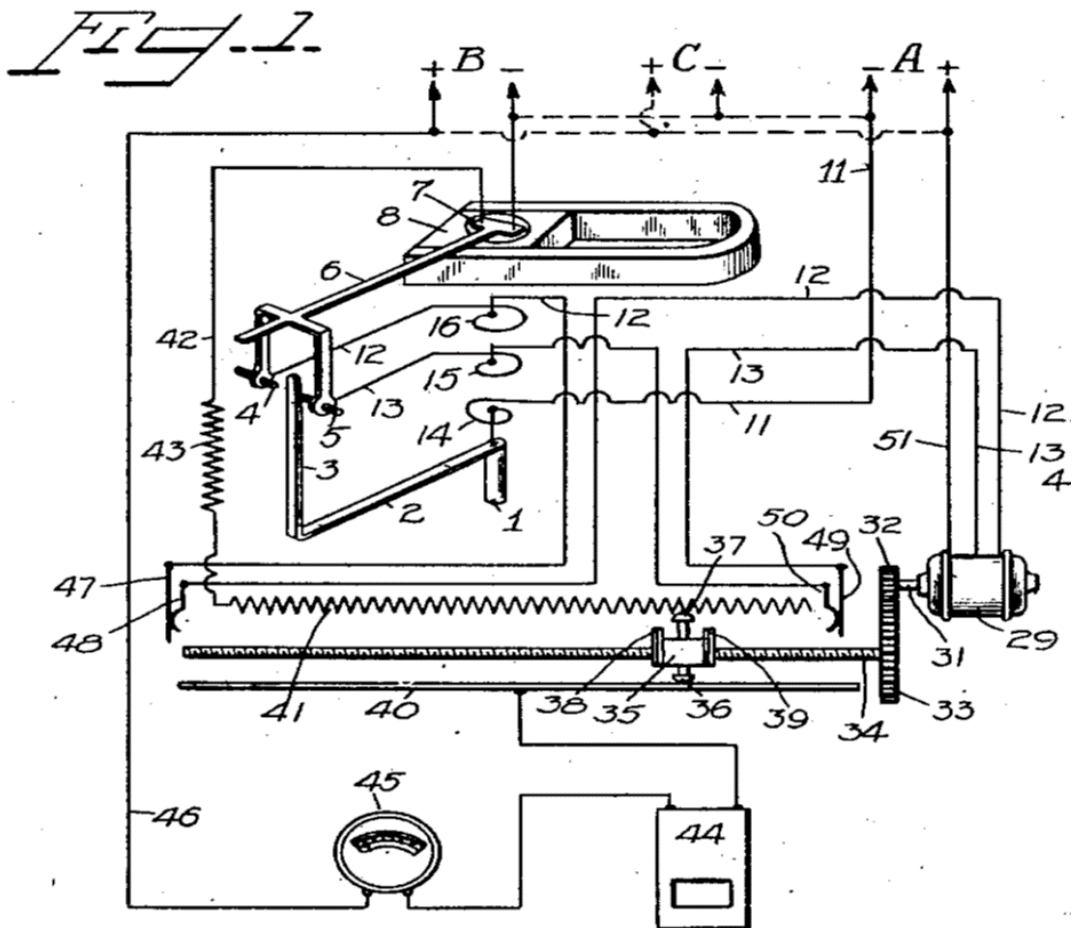


FIG. 12.

The second system senses changes in the same way but uses a small motor to move the slider of a variable resistor to both change the contact pointer position and generate a signal for transmission to the remote meter – there is no indication as to how this transmission was accomplished and what form the signal took.



Expansion

By the end of the war, the Central England GCA boundaries had been crossed by transfer interconnections from Worcester to Gloucester, Leicester and Corby to Little Barford, Northampton to Bedford and Stoke to Crewe. This last named circuit was critical and of consequently particular interest to National Control as, with just the Bourne to Peterborough line (between Mid-East and South East), it determine half of the total possible North to South flows on the whole Grid system. Stoke's duty as the "frontier town" was removed when the new generating station at Meaford was built in 1946 (depicted at the extreme left-hand end of the Indicator Diagram) and the Crewe circuit was diverted to it.

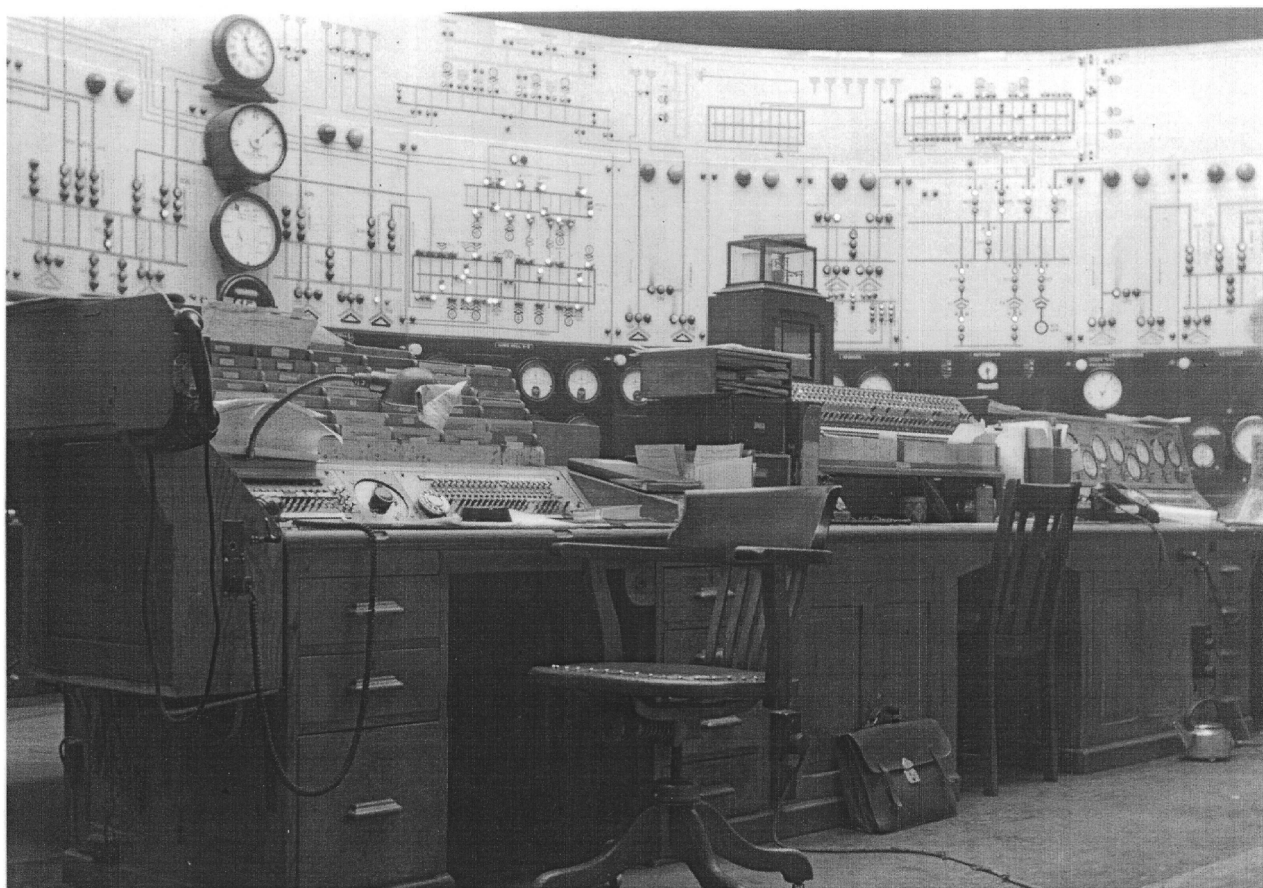


The coming of the Supergrid would relieve these tenuous connections but it all had to be displayed somehow. The station name plates atop the Indicator Diagram had to go, enabling the diagram to be raised by a further 3 feet and such that individual sections no longer necessarily represented single stations. It would have been necessary, therefore, to arrange for the alarm lamps (which remained in their original positions) to light for anything within their respective sections. As the Indicator Diagram grew in height, more large meters were added in the common central section.

From colour photographs, the upper part of the Indicator Diagram appears to be in an eggshell blue with any normally lit lamps causing eventual heat discoloration markings on the finish. As more stations were added, smaller lamps were used to save space such that there developed a variable standard of presentation. It would also appear that there was a different colour standard to that used later for the depiction of Grid circuit voltage since the predominant colour used was red for what appear to have been 132kV circuits. Some small areas of darker colours, possibly blue, were present towards top and lower parts of the diagram. Ken Hooper says that the work to effect

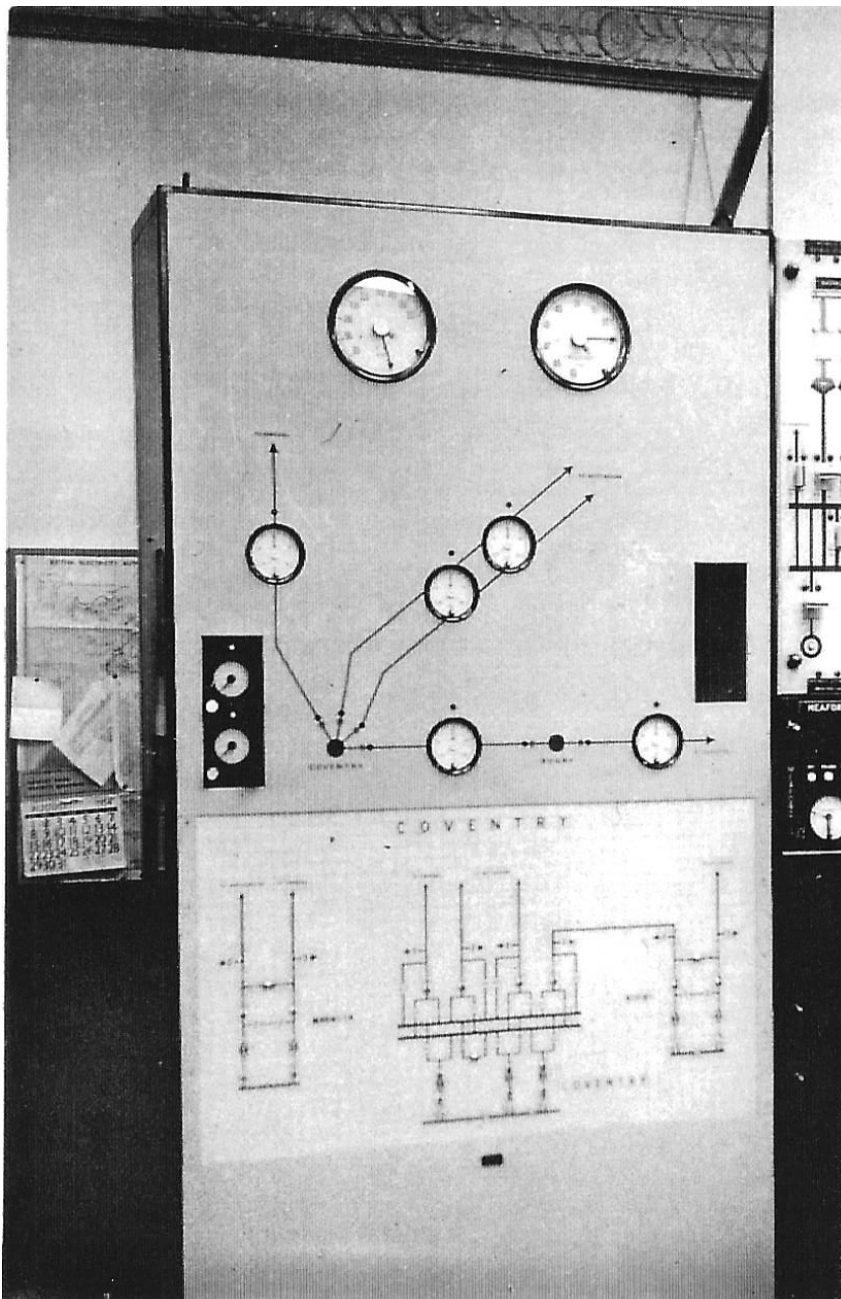
ongoing changes to the presentation on the Indicator Diagram became almost sacred territory, ruled over by System Operations in the shape of a certain Harold Lloyd, and nobody else dared to alter anything on pain of terrible retribution.

Other illustrations of the Control Room (see next picture) reveal the disappearance of the miniature diagram from the centre of the desk to allow for a third occupant, possibly a clerical assistant. The later whereabouts of this diagram or its equivalent has not been ascertained and, since there is no evidence of outage restriction and permit working markers on the Indicator Diagram, safety status and switching configuration may have been located away from any available photographic viewpoint, it being unlikely that such a facility would have been discarded. Whether the miniature diagram was ever electrically connected to the Indicator Diagram is not known. It has been suggested that there was also a power flow metering diagram (also not seen in any photographs) provided later.



Despite the vertical extension of the Indicator Diagram (which can be seen in the picture above), the portrayal of the post-war East and West Midlands Divisions, together with some of the first Supergrid stations, was becoming increasingly squashed into the limited display space originally designed for the old Central England 132kV Grid and, as a consequence, was beginning to lack sufficient clarity for guaranteed safety of operation. Comparisons between views of the then new, uncluttered Control Room and its appearance at the end of its days, show just how small it really was.

Towards the end of Wake Green Road's existence as a Control Centre in the mid-1950s and as a foretaste of what was to come, GEC's prototype version of the BEA Standardised Major System connected to the Coventry generating station appeared in the Control Room. The display cubicle was positioned at the left-hand end of the room (see picture below) beside the (Meaford) end of the Indicator Diagram and, in a single display of three Grid sites, demonstrated all of the future facilities which would soon become available in the new Control Centres currently being designed by Headquarters. This Major system also showed the versatility of the Standardised System in that there were two Minor stations attached to it for Warwick and Rugby. On a sheet steel panel was a load flow diagram of the Grid connections between the three stations, together with line end open and amp overload indications. A total of eleven meter readings were displayed namely, five line flows, a system volts and a frequency and two sets of station TGO Watts and VArS, the last four meters being mounted in two 100-point generation instructor panels. Beneath this display was a 1-inch mosaic panel showing the switchgear configuration for the same local area. Views of the Relay Room show what appears to be the equipment rack serving this Control Room cubicle but a smaller rack next to it is something of a mystery. It is a possibility that this was one of the two minor stations, installed separately, since the normal metering total for a basic major was ten readings.



National Control at St. Pauls (down the Hole) had displays of all inter-area line flows but, since it appears that none of these were transmitted from Birmingham, they would have been sent from Manchester and Bristol. Dedicated communication with National was only by means of a teleprinter whilst the other CISs could be accessed through rented circuits linking stations either side of the area boundaries such as between Meaford and Crewe. National could have been contacted through the Northampton - Bedford link to the South East Control which shared its telephone exchange with National. However, when National moved "upstairs" to Paternoster in 1950, each GCC then had a direct line to it, thus enabling more metering to be transmitted and with the added luxury of direct telephony.

Whilst Wake Green Road tried to contain itself, plans were afoot to provide its successor.

The building design for the new Birmingham Grid Control Centre (GCC), together with the technical planning including that for its outstations, was well under way during the latter years of the BEA before 1954.

The post-war austerity conditions forbade the construction of new office buildings but for reasons of access to GPO trunk cable routes, the GCC and its offices were permitted to be constructed as a totally new building. The site chosen was in a field, believed to have been purchased from the local authority, to the north side of Redhill Road and its junction with the A441 Redditch Road, in the West Heath area of south Birmingham.